P.T. Socfindo Research & Development program

2007 – 2008 Activity Report

Task Force

Scientific and Technical Adviser activities

General comments

SCOPA Technical Committee

June 2008

P.T. Socfindo Research & Development Program
2007 - 2008 SCOPA ACTIVITY REPORT

Task Force, S&T Adviser activities, and general comments

1. Preamble

The object of the Socfindo – Cirad Oil Palm Agreement (SCOPA) signed early 2002 is to renew the cooperation between both signatories. According this agreement, Cirad assigns directly a senior staff to PT Socfindo as Scientific & Technical Adviser, with the approval of the PT Socfindo' Principal Director. The guidance of the Scientific & Technical Adviser activity is advised by the Technical Committee of the SCOPA.

Cirad is providing technical assistance to PT Socfindo in the following fields:

- design, organization, monitoring, analysis and interpretation of results for the genetic improvement programme and commercial seed production, based on results from local trials and from the international network coordinated by Cirad, and on research conducted on the subject by the latter,
- steering of the fertilization programmes for the commercial plantations, through an open-ended experimental network, making it possible to gradually incorporate the latest results and make more cost-effective use of the recommended inputs,
- identifying, programming and implementing any applied research judged necessary to improve crop management sequences for oil palm at PT Socfindo. Such research covers the fields of Agronomy, Genetic Improvement (including biotechnologies and variety creation), and Crop Protection,
- Staff training for both parties,
- Participation, at PT Socfindo's request, in decision-making for technical management of the estates.

2. SCOPA Task Force

2.1. Involved staff

The list includes only the staffs of PT Socfindo or Cirad mainly involved in the activities. Many other staffs have also a part of their activity linked with the SCOPA.

2.1.1. For PT Socfindo

At Head Office:

Ir. Bincar, Agricultural Department (Crop protection)
Ir. Erwanda, Agricultural Department (other activities)

At Pusat Seleksi Bangun Bandar (PSBB):

Ir. H. Hayun Zaelanie, Manager,
Ir. Indra Syaputra, Chief - Assistant,
Ir. Taufic, Field – Assistant
Ir. Ricki, Field – Assistant
Ir. Chandra Adi Pasha, Field - Assistant
And 240 employees / contractors for seed production, seeds sale and breeding operations.

At Aek Loba Estate:

Ir. H. Edyana Suryana, Aek Loba Projects Chief – Assistant
Ir. Dadang Afandi, Field – Assistant.
And 105 employees / contractors for AL projects laboratories and field operations, including seed garden opening.

2.1.2. For Cirad

Based at PT Socfindo
J.Ch. Jacquemard, Scientific & Technical Adviser.

Consultants based at Montpellier

T. Durand – Gasselin (Breeding),
B. Cochard (breeding, but not involved in 2007 / 08 ???)
H. Hubert de Franqueville (Phytopathology and Ganoderma disease),
L. Ollivier (Crop Protection),
J. Ollivier (Agronomy)

Support at Montpellier

L. Blangy (Seed sale)
A. Flori (Statistic, Breeding data management, storage)
Y. Galouyé (LSU analyse)

2.2. Involved facilities

2.2.1. At PT Socfindo

- 250 ha of parental garden and germplasm at PSBB
- 510 ha of progeny and genetic trials from Aek Loba Timur Breeding Project
- 241.4 ha of collection, seed garden, parental garden and progeny trials from Aek Kwasan II Breeding Project
- 10 agronomy trials located at Aek Loba, Mata Pao, Negeri Lama, Seumanyam and Seunagan Estates,
- 329 ha of Ganoderma field tests trials located at Mata Pao, Tanah Gambus and Bangun Bandar
- 1 Phytopathology laboratory focused on Ganoderma screening early test

2.2.2. At Cirad

- Laboratory facilities (leaf analyses)
- Database management for breeding and agronomy purposes

After the scientific re-organization of Cirad, the Cirad research programs covering the PT Socfindo Research & Development Programs and the IPM / BMP targets are split between the following operations:

Involved research units

After the scientific and management re-organisation of Cirad, the Cirad research programs covering the PT Socfindo Research & Development Programme, the IPM and BMP targets are split between the following departments:

At Cirad – Bios department[1]:

Oil palm breeding - UPR28 (Breeding and seed production)
Controlling pests and diseases in tree crops - UPR31 (Integrated Pest Management)
Development and Improvement of the plants - UMR DAP (Marker Assisted Selection, Vegetative propagation)
Biology and genetic of plant-pathogen interactions - UMR BGPI (IPM)

At Cirad – Persyst department:

Performance of tree crop-based systems - UPR34 (Best Management Practices)

At Cirad – ES department:

Geographic information for agro - environmental management –UMR TETIS (GIS, Remote Sensing)
Functioning and management of tree-based planted ecosystems - UPR80 (BMP, Breeding, Agronomy)
Water management – UMR G Eau (water management)

[1] Underlined items represent research units with strong interest for Socfindo

3. Scientific and Technical Adviser activity and general comments

3.1. Introduction

According the article 4 of the SCOPA concerning the role of the Scientific and Technical Adviser, it will be directly involved in the implementation and co-ordination of certain operations, of which both parties will update the list each year, if necessary. Both parties will define the responsibilities of the Scientific and Technical Adviser, those of SOCFINDO and those of CIRAD researchers, for each operation of the annual programme.

Annex 2 includes summary of 2007 general comments and food for thought needing emphasization in Cirad support.

3.2. Work schedule for 2007 / 2008

This work schedule for 2007 / 2008 presented has been reviewed according the new presentation of the PT Socfindo Research & Development programs.

3.2.1. Research & Development program for Agronomy and Field Practices

Support to fertilization programme

- Support in steering the commercial fertilisation programme
- Assistance to the implementation of new agronomy trials
- Monitoring of the specific observation programme in the concerned agronomy experiments at Aek Loba Estate (ALCP 61, ALCP62, ALCP09)

Field practices, plantation management and mill processing

- Monitoring of the ripeness criteria through specific experiments
- Monitoring of the "Pollinator trees" experiment
- Monitoring of the improvement of the manual assisted pollination
- Support and assistance for the implementation of the GIS programme at PT Socfindo
- Monitoring of the Oil Extraction Rate at Aek Loba Estate through specific experiments
- Monitoring of the improvement of the control of *Mucuna bracteata*

Improvement of the mineral nutrition knowledge of the future planting material

- Monitoring of the ALT Genetic Block fertilisation programme in co – ordination with Agricultural Department and Cirad consultants

3.2.2. Research & Development program for Breeding and Seed Production

Variety creation

- Breeding programme
    - Monitoring of the crossing maps in co – operation with Cirad consultants
    - Monitoring of the observation related with the MAS programme (ALGP29)
- Aek Loba Timur genetic bloc
    - Monitoring of the Aek Loba Timur Genetic Block activities
    - Monographs of ALGP04
    - Monographs of ALGP06 to ALGP10
- Aek Kwasan II project
    - Monitoring of the operations (work programme, germination, prenursery, nursery, field preparation, plantation) with all involved operators (Head Office, PSBB, Aek Loba, Cirad)

Variety propagation

- PSBB
    - Follow-up and assistance in implementing the seed production programme (Bangun Bandar), respecting instructions specific to such production,
- Aek Kwasan II
    - Preparation of the transfer of the seed production activities to Aek Loba
    - Implementation of the new seed garden
- Participation to the new Vegetative Propagation laboratory creation

3.2.3. Research & Development program for Crop Protection

Integrated management of the BSR

- Follow – up and assistance to the observation in the Gano 1, Gano 2 and Gano 3 located at Mata Pao, Bangun Bandar and Tanah Gambus
- Monitoring of the observation in the Aek Loba Timur Genetic Block

Integrated management of Oryctes and other pests

- Preparation of a specific R&D programme to control the *Oryctes rhinoceros* in the Socfindo estates in co – operation with the Cirad consultants and the industry
- Implementation of the biological control of *Oryctes rhinoceros* at Aek Loba

Integrated management of the fruit set

- Monitoring of the *Elaeidobius kamerunicus* population, preparation of a specific R&D programme to follow – up the seasonal variation of its population in co – operation with the Cirad consultants and the industry

3.2.4. Research & Development programme for Environment, Social and Sustainability

Integrate the RSPO principles and criteria in the PT Socfindo management and field practices

- Preparation of the integration of the principles and criteria for SPO in the management and field practices at PT Socfindo
- Participation to the identification of the indicators needed to evaluate the SPO principles and criteria
- Participation to the implementation of ISO14000 procedure
- Participation in technical meetings, customer visits, etc, whenever useful or desired, at PT Socfindo' request

Develop new projects taking in account the Environment protection

- Participation to various projects (BACP, PanEco)

3.2.5. Publications, Conferences and general reports

In first priority: the R&D report

3.3. 2007 / 2008 Activities[2]

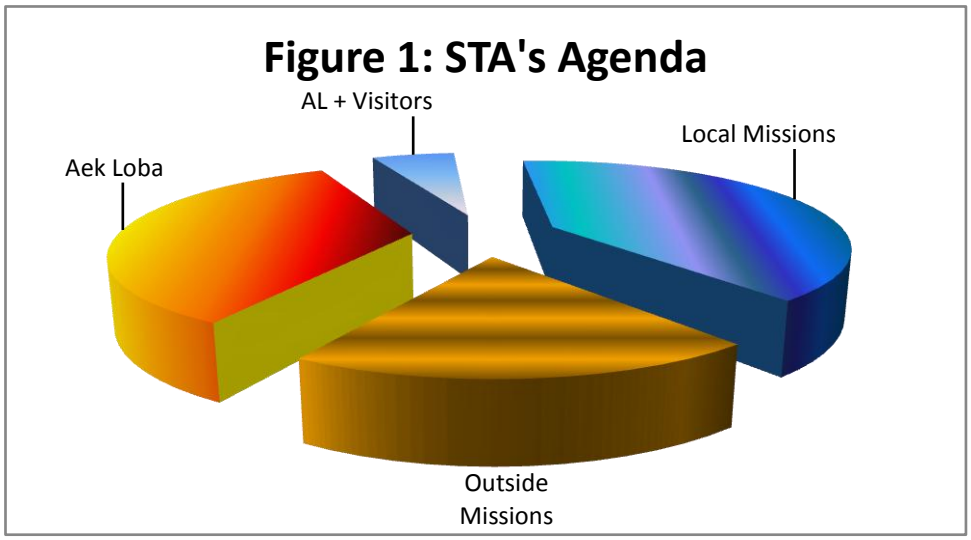
3.3.1 Agenda

TABLE 1 summarises the STA's agenda since July 2007.

TABLE 1: 2007 – 2008 STA's Agenda (in days)

Month	STA's agenda				Cirad Consultants received (days)	Socfinco Visitors Received (days)
	Aek Loba	AL + Visitors	Missions			
			Local	Outside		
July-07	6	0	2	9	0	0
August-07	2	0	5	5	0	0
September-07	8	4	14	0	0	26
October-07	12	0	0	11	0	0
November-07	3	0	3	21	29	0
December-07	2	0	7	3	20	0
January-08	8	0	8	0	0	0
February-08	17	0	8	0	0	0
March-08	6	2	16	0	12	2
April-08	6	0	21	0	12	10
May-08	11	0	7	5	17	0
June-08	5	8	8	3	45	24
Total	86	14	99	48	135	44
%	35	6	40	19		

For the period July 2007 – June 2008, the STA's Agenda *(Figure 1)* is shared between 2 unequal parts: 41% of the time at Aek Loba and 59% of the time outside Aek Loba, but 65% of the STA's time is



dedicated to visitors (Cirad and non – Cirad), local missions and participation to conferences. At Aek Loba, a 15% of the time is devoted to visitors. The cumulative number of days for Cirad Consultants missions reaches 135 and 44 for Socfinco partners.

[2] For each section, in addition to the STA's activities, a general progress status and comments are delivered. Of course, these activities involve also Socfindo teams

3.3.2. Research & Development programme for Agronomy and Field Practices

A specific report taking stock of activities in this program has been produced. It is attached to the current report. The report has been co-written by JC Jacquemard and J Ollivier.

Support to fertilization programme

Support in steering the commercial fertilization programme

The STA participated to the Consultant field visits in the Group I (Seumanyam, Seunagan and Sungei Liput), in the group II (Tanah Gambus, Bangun Bandar and Mata Pao) and in the group III (Aek Loba and Negeri Lama). As explain in R&D Report, new program of fertilization has been produced. It is based on maintenance – correction doses and specific critical level for each estate. The new program takes in account the production potential of the trees and the soil fertility. For 2009 and after, the program should consider specific critical level for each block in estates, combining soil and genetic background effect. New definitions of soil fertility classes, based on soil chemical properties should be assessed for 2009 also. A fine tuning has been done with Agricultural Department support. The leaf samples network should be simplified by using only one sample per block.

BOX 1:

☺ Fixed fertilisation program is implemented from N0 to N5

☺ New fertilisation program using maintenance and corrective concepts is running

*☹ Stubborn Boron deficiency in some commercial Deli * La Mé materials are not resolved*

☺ A general program for EFB application is running

Assistance to the implementation of new agronomy trials

The general survey of Socfindo Agronomy trials network has been set up during the current period. Following accurate analyses produced by our consultant, we were able to renew totally this network and introduce their main conclusions in Socfindo fertilisation program.

Seven trials are stopped: TGCP05, MP CP03, NL CP02, AL CP07, AL CP08, AL CP09 and SN CP02.

New experiment network, following new requirements as EFB application and use of Compound fertilisers are under implementation on several estates as described below:

- Seunagan to study the **compound fertiliser**: objective is to prove that the uptake of compound is better than straight fertilizers, which could allow reducing the quantity of compound fertilisers.
- Trial on **EFB,** to compare the optimum dose combined with a reduction of the inorganic fertilisers.
- Sungei Liput: on soils subject to flooding to study the effects of fertilisers with silt deposit.
- Tanah Gambus: replacement of TGCP05, a **N^4K^4 factorial** to study higher doses compared to SFD.
- Aek Loba to study the **interaction Genetic material x fertilisation** and compare nutrient assimilation between the main categories of Socfindo catalogue.

Monitoring of the specific observation programme in the concerned agronomy experiments at Aek Loba Estate (ALCP 61, ALCP62)

ALCP61 / ALCP62

Early results on bunch analyses show surprising information (general decreasing of OER with increasing of fertilisation). So a new round of bunch analyses has been set up. It should be achieved at the end of 2008, beginning 2009.

A specific program dedicated to the evaluation of mineral leaf contents characteristics, exploiting ALCP07 results, should be implemented in the coming months.

Field practices, plantation management and mill processing

Monitoring of the ripeness criteria through specific experiments

4 experiments has been setup on this topic:

Evolution of the bunch characteristics through the year (based on two batches of clones)

In addition to the recloning effect detected in this experiment, fluctuation of OER through the year is confirmed. This fluctuation is quite strong from 21.1 % to 25.9 %. The correlation analyse establish that an effect hierarchy of the bunch components could be addressed from higher to lower correlation:

Fruit to bunch (0.90***)
Average bunch weight (0.71***)
Mesocarpe to fruit (0.58**)
Oil to mesocarpe (0.49*)

Fruit to bunch explain 80% of the fluctuation of the OER, the other characteristics explaining 30% or less of the fluctuation. Still running, there is no additional information compared to last year one.

Evaluation of the number of detached fruits before and after harvesting in commercial conditions and maturation dynamic

These experiments are stopped. Their main results could be summarized as follow:

Evaluation of harvested bunches (3 harvesters, no choice, criteria ≥ 3 detached fruits before harvesting, data ALES10)

Composition	Number of detached fruits before harvesting	Number of detached fruits after harvesting	Expected OER **	Contribution
7%	3	24	23.80	1.666
10%	4 to 5	47	23.85	2.385
18%	6 to 10	53	24.40	4.382
65%	> 10	134	24.60	15.99
Mean	24	120*		24.42

* Estimation from ALES11 based on 24 detached fruits before harvesting

** Estimation from ALES06

Estimation of the criteria effect

Criteria	Estimated number of detached fruits before harvesting	Estimated number of detached fruits after harvesting	Increasing of the detached fruits to collect	Estimated OER
3	24	120		24.42
5	30	137	+14%	24.56
10	36	154	+28%	24.60

Number of maturation days needed to move from criteria 1 fruit to criteria 3 fruits: 1 day

Number of maturation days needed to move from criteria 3 fruits to criteria 10 fruits: 1.5 days

Study of the bunch components and OER on commercial blocks at Aek Loba and Padang Pulo Estate

Mid-term data are repeated here.

OER appears at its optimum in N4
OER per categories appears significantly different from 23.3 to 26.9%, but the number of analyses remains low for some of them
OER at Aek Loba Timur divisions appears slightly lower than the other divisions (age, or soil quality, and / or climate conditions)
S6305 category has been planted from 1992 to 2002. After 1998, the analyses show an increasing of the OER for 0.6 point from 24.4 to 25.1 % and a decreasing of KER of 0.6 point from 4.1 to 3.6 %.

Final report should be produced this year. **The concept of commercial bunch analyses as independent control body should be extended to other commercial estates.**

Monitoring of the "Pollinator trees" experiment

As say last year, the concept is interesting, but needs further investigations (planting materials, competition effect, and reactivity of the trees in all ecologies). The initial experiment is stopped and the pollinator trees now competing with their neighbors have been uprooted. First analyses and observation, started in December 2007, on ALGP 35, planted in 2006 and devoted to male producing materials, should be available in the coming months.

Support and assistance for the implementation of the GIS programme at PT Socfindo

The GIS experienced at Aek Loba and Padang Pulo under Arcview® is ready for last year to be extended to the other estates. To date, the mapping is ready for the following estates:

In the group I: Seumanyam, Seunagan, Lae Butar and Sungei Liput
In the group II: nil

Box 2
Implementation of dedicated GIS body becomes a real priority for Socfindo. Support from Cirad on that matter has been required for years

In the group III: Aek Loba and Padang Pulo

Human and material resources need to be addressed to this operation. Socfindo has required Cirad input for user's interface for years.

Improvement of the mineral nutrition knowledge of the future planting material

Monitoring of the AL Genetic Blocks fertilization programme in co – ordination with Agricultural Department and Cirad consultants

All Aek Loba genetic blocks fertilization follows now the commercial fertilisation program adopted this year with 3 years running means for leaf contents data. Each trial got its own critical level.

3.3.3. Research & Development programme for Breeding and Seed Production

Variety creation

Breeding programme

Monitoring of the crossing maps in co – operation with Cirad consultants

To date, nearly 80 crossing maps are running at PSBB to achieve the breeding programme. New crossing maps under construction concerning Yaligimba material introduction and exchange with Socfinco.

The following TABLE 2 summarises their objects:

TABLE 2: Running crossing maps at PSBB

Object	Number of crossing maps	Object	Number of crossing maps
AKII part 0	closed	Backcrosses	2
AKII part I	6	Seed Garden	25
AKII part II	8	Parental Garden	4
AKII part III	4	Breeding	15
AKII part IV	6	Ganoderma program	2
Pollinator trees	2	Wilt test	3

Monitoring of the observation related with genomics

Possible illegitimacies have been discovered in Socfindo and Pobe germplasms (contaminated LM2T selfed planted in 1976) and many question marks recorded after analysing Aek Loba Timur breeding bloc. After Cirad consultants proposals, the following Identity Control program (or ID Checking) has been agreed:

- Step 1: all pisifera and their parents
- Step 2: 1976 LM2T selfing
- Step 3: all deli families, plus deep checking where necessary
- Step 4: Questionable progenies in ALT genetic bloc
- Step 5: Full AKII project (progeny tests, parental and seed garden)

Leaf sample preparation laboratory is running at PSBB since last March and is able to send around 400 samples per month to Cirad Montpellier.

Aek Loba genetic blocs

Monitoring of observation recording

A new set of observation routine programme has been implemented. A large part of it should be available too from Aek Loba Timur genetic bloc, but it concerns all Aek Kwasan II genetic bloc including seed and parental gardens.

- Half-yearly Ganoderma census
- Annual tree survey
- Individual recording of the yields from 3 years old
- Bunch analyses from 5 to 6 years old (eventually later)
- Oil composition
- Biennial leaf content analyses per progeny up to 10 years old, then after triennial program
- Vertical growth at 6, 9, 12 and 15 years old
- Vegetative characteristics (projected canopy at 9 years old, leaf area at 10 years old)
- Weekly male flowering census per tree (from 3 to 13 years old)

Box III

Socfindo is still waiting since last year full Cirad proposal from Cirad concerning:

☹ Use of MAS in R&D program for breeding and observation to realize in ALGP29

☹ Formal report on Certipalm results and developments

Recent studies

Evolution of Ganoderma spread over Aek Loba Timur genetic block

This study of Ganoderma spread over Aek Loba Timur genetic bloc covers all the planting periods with special attention to 19995 – 1997 plantings. In addition to the estimation of the percentage of palm affected by Ganoderma, a Ganoderma Index is calculated.
2007 Ganoderma census at Aek Loba Timur gives interesting new information despite relatively low level of disease. But spread of Ganoderma starts to be substantial in some progeny trials and some progenies. For example, Ganoderma attacks reach 11.2% in ALGP 03, studying DA115D * DA3D materials and the worst progeny recorded presents nearly a quarter of its trees affected or killed by the disease. All planting years merged, BSR affects between 1 to 2.6% new palms per year in mean. The growth seems similar than that we observe in Group II.

Deli Socfindo * Congo Socfindo appears more tolerant than Deli * Yangambi or Deli * La Mé. The best deli origins on the current step of our observation, seem to be BB126D * BB150D, BB206D selfed, BB177D * BB129D, DA10D * DA3D, DA5D * DA3D, LM269D * DA128D. More investigations are required to ensure the qualification of DA5D * DA3D because LM3038D and this of LM269D * DA128D because LM269D which is very susceptible. DA115D and all its recombination are susceptible.

Without further investigation it is difficult to confirm the tolerant status of LM2T selfed and LM5T selfed. Partial legitimacy of LM2T selfed parents, from Pobé or PSBB is a real issue. BB85T, BB85T * BB20T, LM718T * LM238T appear tolerant enough. LM10T and all its recombination are susceptible.

All these results should be considered as mid-term results but they allow a good progress in Socfindo material improvement, particularly in removing the most susceptible materials in general and select the most promising families to be tested at TG Phytopathology laboratory.

The Ganoderma status of the genitors that Socfindo is receiving from Pobé has been examined also. 6 genitors from A Group and 8 genitors from B Group have being identified with poor behavior. Their introduction is questionable. On same way, introduction of some DA10D * DA3D from Pobé (1 or 2) is also questionable.

Male flowering at Aek Loba Timur genetic bloc

The planting material studied here comes from Aek Loba Timur project. All the 28 planted trials are concerned. Because substantial differences in their behavior between young age and adult stage, they are grouped in three parts:

1995 and 1997 plantings
1998 to 2000 plantings
Clones trials

Permanent evaluation of male inflorescence production in PT Socfindo progeny trials has been decided in 2003 second semester after first studies showing that in some categories like IL4905 or S6305 (or [DA5D * DA3D] * LM2T materials) very long period of poor male production (below 2.5 male inflorescences / ha / round) could be observed at adult stage. In parallel, specific programme to improve the fruit set was implemented: pollinator tree concept, selection for male, etc.

The best variable to evaluate the capacity of one progeny to self-supply its needs for pollination is Low Male Flowering (LMF). It represents the percentage of observed time where the NMI is lower than 2.5 male inflorescences per hectare. This criterion is the lowest acceptable limit before application of assisted pollination.

In a first step, criteria for high LMF risk is established to LMF ≥ 70% for very young age (3 to 6 years) and LMF ≥ 50% at full adult stage. According extensive observation in the field, above theses limits, substantial consequences arise on fruit set with corollaries on OER and FFB.

Around 29% of the best 20% progenies selected in each 1995 / 1997 progeny trials suffers from high LMF risk. It is slightly more than the proportion observed in the rest of the materials. In the 1998 / 2000 progeny trials, around 54% of the best 20% progenies present very high LMF risk, without significant difference with the remaining tested materials.

At young age, 5 A group origins, DA115DxDA3D, LM404D selfed, (DA5DxDA3D) selfed, (TNR115xLM630D) II and DA10DxDA3D as well as 8 B group origins, LM2T selfed and LM2T II, LM5TxLM311P, LM13T selfed, LM5TxLM10T, LM10T selfed, LM2TxLM10T and LM2TxLM5T demonstrate their very high LMF risk. Combination with these families needs probable permanent and cautious monitoring of the number of male inflorescences produced for supplying pollen.

At adult age, only one A group family, LM404D * DA3D, presents very long period with high LMF. But 5 others are quite close to 50% time limit: (DA5D * DA3D) selfed, all recombination with LM404D and DA10S * DA3D. Three B group families show substantial number of parents inducing very long LMF period: LM2T selfed and LM2T II, and LM10T selfed.

Simulation of expected LMF in the current seed production programme reveals that a large majority of Deli * La Mé categories produced at PT Socfindo cannot avoid doing assisted pollination up to 6 or 7 years old. Trickier, a part of the precedent categories maintains its high LMF risk (between 40 to 50% of the recorded period) at full mature age. At this age, assisted pollination is not practicable. This poor male flowering induces heavy fluctuations in OER or in crop as recorded in many estates.

This study demonstrates clearly that the recording of the male inflorescences production is crucial variable evaluating the performance of the genotypes in the progeny trials in addition to the other variables as CPO / ha, OER, height increment, canopy extension and Ganoderma susceptibility. CPO and OER are depending closely from the good pollination of the female inflorescences.

The study shows that, in many cases, excellent performance of genotypes is fully dependant to their environment for pollen supply, not only at young age but also at full adult stage. Such genotypes are excellent only because there are “bad” progenies in their vicinity. The phenomenon is amplified for the clones.

Revision of Seed production programme and evaluation criteria of the parent quality should take in account this new criterion.

Other studies
Summary of our 2007 PIPOC paper is presented below:

The trends generally agreed for the future of palm oil as an important commodity are the combination of a demand for food that will double over the next 20 years, the emergence of new uses as a renewable energy source, and (until the recent price exuberance over biodiesel) the falling price trend of palm oil in real terms on the world market.

For more than 30 years, the average crop yield of the land under exploitation in the world does not exceed 3 t CPO / hectare / year. The boom in availability of the commodity is thus almost entirely due to the large increase in cultivated surface area, resulting in competition with the other food crops for arable land, and participating in the disappearance of tropical rainforest and needless environmental degradation. In turn, this fuels the regular disparaging media campaigns against the oil palm industry.

The principles and criteria for sustainable palm oil were adopted by the general assembly of the *Round Table for Sustainable Palm Oil* in November 2005. They embody a commitment to long-term economic and financial viability, the use of appropriate best management practices, and an improvement of environmental and socially positive impacts whilst reducing the negative ones. The planting of improved and adapted oil palm planting material is a key input to achieve these commitments.

This paper presents evidence of the effects of continuous improvement of planting material on the profitability of the crop. Highlighted is the widespread use of poor quality material, and the alternative value of PT Socfindo planting materials enhanced by the cooperation of Cirad – France and its network.

The challenges to be faced for the future by breeders and seed producers, as well as plantation management are discussed.

Aek Kwasan II project

Monitoring of the operations (work programme, germination, prenursery, nursery, field preparation, plantation) with all involved operators (Head Office, PSBB, Aek Loba, Cirad)

Aek Kwasan II project is progressing surely. TABLE 3 summarises the progress.

TABLE 3: AKII project progress

Year	2004	2005	2006	2007	2008	2009[3]	Total
Progeny Trials (nb)	0	2	5	8	4	8	27
Parental Garden (ha)	0	5.38	5.53	39.24	25.6	27.50	103.25
Collection and other (ha)	1.17	2.06	1.40	2.19	2.70	0.30	9.82
Seed Garden (ha)	0	8.18	7.73	15.08	4.80	40.60	73.39

Exact surfaces should be assessed when all planting reports and protocols are available. Taking in account introduction of Yaligimba germplasm and its progeny testing program, some guidelines have been reviewed. Objectives are securing surface for that purpose and limit parental garden and progeny trials area on Aek Loba Estate at reasonable level.

Then, representation of parents in the parental garden through their selfings is now limited to 70 trees maximum for each of them. Lattice design seems not essential at results interpretation and the number of trees per progeny will be limited to 64 for T*D types and 50 for D*P types and 4 replicate. A better management of mating design should allow better connection between tested parents.

If the progeny trials and collection programmes are progressing well, the seed garden and the parental garden are moving slowly than expected. It will be probably difficult to achieve these parts of the project in 2010.

[3] Expectation

BOX IV:

☹ This box, already shown last July, must be presented again. It is summarising Socfindo and customer's requirements. In addition to OER and FFB that is cornerstone of the planting material quality; other characteristics must also be considered. We are still waiting for Cirad input on that matter.

Palms better adapted to specific environmental conditions

Where the development of the industry in a large country like Indonesia expects development of 9 million ha of oil palms as an objective, it is certain that a large part of the oil palms established cannot be only under the best agro – climatic conditions.

Tolerance to various stress factors such as drought, wind, temperature, etc.

Global warming, the regular occurrences of El Niño / La Niña phenomenon… have long trend implications which should be investigated to study their effects on the potential of the planting material.

Palms better adapted to specific nutrient requirements

The huge demand on the fossil energy, and the over – exploitation of the rock fertilisers, are a clear sign that the cost of the fertilisers increases substantially in future. Fertilisers are a major input requirement for the successful production of palm oil. A more efficient planting material requiring less fertilizer should be an advantage.

Resistance or tolerance to specific diseases and pests, such as *Ganoderma*, *Fusarium* wilt, *Oryctes*, etc.

Indonesia and Malaysia enter now in replanting cycle of their large industry. The African experience of Wilt disease shows that a genetic answer to limit the spread and the economical effect of such diseases is possible. Genetic adaptation of the planting material should be also a part of best management practices (BMPs) as several studies on the link between planting material and pest spread is apparent.

Economic considerations such as; fast/slow growth, height increment, high bunch number/low weight or low bunch number/high weight, high extraction/lower bunch weight, sex ratio, CPO/PK ratio, compact palms, etc.

Downstream or end-user requirements such as olein/stearin ratio, Iodine Value and carotene content, etc.

Exchange with Pobé

There is persistent misunderstanding on that matter. Some additional seeds and pollen are on the way to Socfindo. But, the clear time schedule that is to say: proper calendar, achieving the program of the exchange from Pobé to Socfindo required for years by Socfindo has been never produced.

Variety propagation

PSBB

Follow-up and assistance in implementing the seed production programme (Bangun Bandar), respecting instructions specific to such production

Socfindo is certified ISO 9001 – 2000 since November 2001 for its seed production at PSBB. The current potential of commercial seed production reaches 45 million dry seeds. It is based on the exploitation of 7500 dura palms and 395 pisifera palms. Some types of planting materials, as Wilt tolerant materials, remain under import of specific pollens necessity. Socfindo produces 73 % of Deli * La Mé categories and 27% of Deli * Yangambi categories.

The current programme exploit general combining abilities of genitors selected from Cirad network, Aek Kwasan and Aek Loba Timur breeding blocs. In the A group, 44% of the mother trees come from good or excellent genitors tested at Aek Loba Timur and 24% from Aek Kwasan breeding bloc. 69% of the genitors comes from DA5D*DA3D, DA115D or LM404D*D10D. DA5D*DA3D is represented by 3 parents, DA115D by 8 parents – including LM3005D, which is susceptible to Ganoderma and LM404D*DA10D by 4 parents.

In the La Mé B group, 67% of the pisifera palms come from good or excellent trees tested at Aek Loba Timur breeding bloc. There is no representation of the B parents rested at Aek Kwasan. 71% of the pisifera palms come from LM2T*LM10T, LM10T selfed and LM5T*LM10T. LM2T self is represented by less than 3% of the pisifera only.LM2T*LM10T is represented by 4 second cycle genitors, LM10T selfed by 3 parents, including PO3281T, which seems to be susceptible to BSR and LM5T*LM10T by 5 parents.

In the Yangambi B group, 66% of the pisifera come from excellent parents from Aek Loba Timur genetic bloc. 73% of the pisifera palms come from LM718T*LM238T, which is represented by 5 parents.

Between 2006 and 2007, sold seed production has decreased by 6% due to unfavourable conditions in 2005 from 37.5 to 35.2 million seeds. That has been largely compensated by increasing of prices that increased by 23%.

For 2008, expected production rises 45 millions of germinated seeds. 2008 commercial price increases by nearly 50% due to market condition.

Aek Kwasan II

Preparation of the transfer of the seed production activities to Aek Loba

Implementation of the new seed garden

BOX V:

Very few seeds come from Specific Combining Ability. The seed production programme is based on General Combining Ability, but for many combinations, the A and B group families have never been crossed. Thus, we have no idea about the effect of the 20% non additive part on the quality of the seeds and the precision of the information that we deliver to our customers.

☹It is obvious in the field that unacceptable characteristics appear like fruits at the extremity of the spikelets, abnormal palms, and stubborn boron deficiency. The large presence of *Curvularia* in the AKII seed garden and parental garden nursery is also worrying for the future. As underlined in BOX IV, Socfindo and its customers require more precise information about the planting materials.
Cirad should advise Socfindo and propose all means to minimise the effect of the non additive part in the seed production.

Of course, the requirements expressed in BOX IV are also addressing the seed production.

See Aek Kwasan II project progress. From now, the achievement of the new seed garden is the first priority.

Participation to the new Vegetative Propagation laboratory creation

Since September 2005, Socfindo agreed with the principle to open a Vegetative Propagation Laboratory for the multiplication of oil palm and rubber trees. Concerning the oil palm part, Socfindo specifications has been confirmed as following:

- Opening of a small R&D laboratory studying:
  - The efficiency of the new procedure in Socfindo conditions
  - The conformity of the clones in Socfindo conditions
  - The strategy to choose / to prove the clones
- Produce clones for Socfindo estates
- Eventually, sell some ramets to dedicated customers to evaluate the clones in various environments.

Box VI

☹ Since September 2005, green lights are blinking many times. Action should be taken

Box VII

Accumulation of data form Aek Loba Timur, Gano projects, commercial censuses need to be supported by a specific body at Socfindo Agriculture Department in charge of GIS management. This body should ensure also management of commercial agronomy databases. Socfindo has required for year support from Cirad on the matter, particularly to handle easy to use portal for its Geographic Information System.

Box VIII

Program under construction

3.3.4. Research & Development programme for Crop Protection

Integrated management of the BSR

- Follow – up and assistance to the observation in the Gano 1, Gano 2 and Gano 3 located at Mata Pao, Bangun Bandar and Tanah Gambus
- Monitoring of the observation on all Socfindo Estates

The results of the observation done at PSBB, Aek Loba and Mata Pao have been evaluated Socfindo seed production program and TG Phytopathology laboratory have been reviewed last April with Cirad consultants to take in account new evidence of susceptibility of some parents.

Integrated management of Oryctes and other pests

- Preparation of a specific R&D programme to control the *Oryctes rhinoceros* in the Socfindo estates in co – operation with the Cirad consultants and the industry
- Implementation of the biological control of *Oryctes rhinoceros* at Aek Loba

Since early 2006, a strain of virus affecting *Oryctes* larvae is maintained at Aek Loba. A full set of R & D will be implemented this year, but contamination seems not that easy to obtain. A first set of observation is in implementation at Aek Loba to observe the possible outbreak of *Oryctes* from the chips produced by the new replanting procedures. Simple field experiment has been implemented to evaluate possible land preparation sequences that include the chips spread on large surface every windrow.

Integrated management of the fruit set

- Monitoring of the *Elaeidobius kamerunicus* population, preparation of a specific R&D programme to follow – up the seasonal variation of its population in co – operation with the Cirad consultants and the industry.

Sets of observation and experiments should be fine tuned with Consultant support in the coming weeks.

Box IX

This operation is quoted as very urgent by Socfindo. Fruit set issue remains a first priority in R&D program and Cirad technical assistance

3.3.5. Research & Development programme for Environment, Social and Sustainability

Integrate the RSPO principles and criteria in the PT Socfindo management and field practices

- Preparation of the integration of the principles and criteria for SPO in the management and field practices at PT Socfindo
- Participation to the identification of the indicators needed to evaluate the SPO principles and criteria
- Participation to the implementation of ISO14000 procedure
- Participation in technical meetings, customer visits, etc, whenever useful or desired, at PT Socfindo' request

Integration of RSPO principles and criteria in the management and field practices will be prepared through a set of ISO certifications, which cover the fields of RSPO P & C. The TABLE 4 summarises the different aspects:

TABLE 4: RSPO Components and ISO certification

RSPO Components	Certification families
GMP – GAP - IPM	ISO 9000
Environment	ISO 14000
Health and Security	OHSAS 18000
Social	CSR?
Relationship with workers / communities - rules	?

BOX X:

The Socfindo Programme for certification includes actually 3 programmes:

- Certification for ISO 9001 – 2000
- Certification for ISO 14001 – 2004
- Certification for OHSAS 18000

The programme concerns also the rubber estates and factories. Concerning the oil palm sector, the factory and the refinery complex at Tanah Gambus is ISO 9001 – 2000certified.
For the other oil palm estates, the ISO 9001 – 2000 certification of their mills should be achieved by 2011.
Operations for ISO 14001 – 2004 will start this year in all groups and should be achieved by 2014
Operations for OHSAS 18000 will start also in 2007 and be achieved also in 2014.

Concerning Social aspects, including relationship with the surrounding communities, contacts are already running with a certification advisory body to evaluate the best way to achieve this important point, which is less clearly monitored by the RSPO P & C and their guidance.

Develop new projects taking in account the Environment protection

Participation to various projects (BACP, PanEco)

We are involved in the preparation of a project leaded by PanEco. This project, located in the Tripa swampy forest border would like propose the conversion of fallows to oil palm cultivation in order to preserve the Swampy Forest and its biodiversity. A pilot project of 100 ha is drafted. Operations should start in the coming weeks. PanEco obtains also OXFAM and PT Astra Agro Lestari for this project.

BACP projects seem to be in standby at World Bank.

3.3.6. Consultants missions

As summarized in Agenda above, Socfindo received Cirad consultants for a total of 121 mission days since July 2006. For many of them, consultant missions were coupled.

Dispatched by R&D programs, the following table takes stock of theses missions.

R & D Programme	Consultant / Visitor	Number of missions	Coupled mission	Total number of expert days
Agronomy	J Ollivier	3		38
Breeding and Seed Production	T Durand Gasselin	3	1 coupled with FD	49
Crop Protection	L Ollivier M Bergouin	2 1	 With LO	25 10
Ganoderma CLSA / Scopa	H de Franqueville	2		24
			Total	146

Socfindo received 3 missions for 38 expert days for agronomy, 3 missions for 49 expert days for breeding, 2 missions for 25days, accumulating 35 expert days for crop protection (entomology) and 2 missions, accumulating 24 expert days for Cirad-Lonsum-Socfindo Agreement (CLSA) and Scopa.

BOX XI:

☹ It will be useful for saving Socfindo Staffs and STA time, if the consultant missions could be concentrated on field visits, evaluation of projects, programs and proposals than to computerize data, information or results. These last activities should be fulfilled before the mission through exchange of data by emails.

We would like back to 1 consultant per programme and a maximum of 2 missions per year policy with 1 month for breeding, 1 month for agronomy, 15 days for Crop protection and 15 days for Ganoderma. Thus, a total of 90 days of missions should be sufficient.

3.3.7. Conferences, publications, E-presentations, and general reports

Conferences, visits

Scopa meeting (July 2007, Montpellier – France)
PIPOC 2007 (August 2007, Kuala Lumpur – Malaysia)
RSPO CWG meeting (October 2007, Bogor – Indonesia)
ICOPE 2007 (November 2007, Bali, Indonesia)
RSPO RT5 (November 2007, Kuala Lumpur – Malaysia)

Publications

BASKETT, JPC; JACQUEMARD, JC; DURAND-GASSELIN, T; EDYANA SURYANA, HAYUN ZAELANIE and EKO DERMAWAN (2007). "Planting material as key input for sustainable palm oil" Communication presented at MPOB International Conference PIPOC 2007

OLLIVIER J., de BARROS I., PERMADI P., JACQUEMARD J.C., DUBOS B. and CALIMAN J.P. (2007). "Nutrient balances using the Nutmon decision support system: a study case in an oil palm estate at North Sumatra" Poster presented at ICOPE 2007

BAUDOUIN – OLLIVIER L., BERGOUIN M., JACQUEMARD J.C. and FUAD M. (2007). « Better knowledge of oil palm pest for an IPM approach" Poster presented at ICOPE 2007

E-presentations (slide-show)

PT Socfindo Research & Development programme (May 2008)

Documents and general reports

Socfindo Standard Fertilisation Program version 2008 (March 2008)
Aek Loba Timur Fertilisation Program version 2008 (January 2008)
Evaluation of Ganoderma spread over Aek Loba Timur genetic bloc (March 2008)
Additional evaluation of Ganoderma spread in trials planted at Bangun Bandar and Mata Pao (March 2008)
Some data on harvesting criteria and extraction rate (January 2008)
Male flowering in Aek Loba Timur trials (March 2008)

Research and Development Program for Agronomy and Field Practices: 2007 report (with J. Ollivier, May 2008)
Scientific & Technical Adviser activity report for 2007 / 2008 period (May 2008)
Protocols: ALGP30 to ALGP37, 2006 Parental Garden
Updated AKII planted materials pedigree database
Updated ALT FFB and Bunch Characteristics database
Aek Loba Seed garden opening: Elimination in 2005 seed garden
Aek Loba Seed garden opening: Elimination in 2005 parental garden

3.4. Work schedule for 2008 / 2009

In this program, first priorities according Socfinco needs are underlined.

3.4.1. Research & Development programme for Agronomy and Field Practices

Support to fertilization programme

- Support in steering the commercial fertilisation programme
- Revision of estates soil fertility map
- Assistance to the implementation of new agronomy trials
- Monitoring of the specific observation programme in the concerned agronomy experiments at Aek Loba Estate (ALCP 61, ALCP62)

Field practices, plantation management and mill processing

- Monitoring of the "Pollinator trees" experiment
- Monitoring of the improvement of the manual assisted pollination
- Support and assistance for the implementation of the GIS programme at PT Socfindo
- Monitoring of the Oil Extraction Rate at Aek Loba Estate through specific experiments
- Monitoring of fruit set fluctuation in Socfindo estates

Improvement of the mineral nutrition knowledge of the future planting material

- Monitoring of the ALT Genetic Block fertilisation programme in co – ordination with Agricultural Department and Cirad consultants
- Characterization of Socfindo planting materials

3.4.2. Research & Development programme for Breeding and Seed Production

Variety creation

- Breeding programme
    - Monitoring of the crossing maps in co – operation with Cirad consultants
    - Monitoring of the observation related with the MAS programme (ALGP29)
    - ID Checking monitoring
    - MTA with Pobé
    - Breeding for Ganoderma tolerance
- Aek Loba Timur genetic bloc
    - Monitoring of the Aek Loba Timur Genetic Block activities
    - Monographs of ALGP04
    - Monographs of ALGP06 to ALGP10
    - Growth and canopy evaluation
- Aek Kwasan II project

  - Monitoring of the operations (work programme, germination, prenursery, nursery, field preparation, plantation) with all involved operators (Head Office, PSBB, Aek Loba, Cirad)
  - *Protocols*
- MTA Socfindo - Socfinco

Variety propagation

- PSBB
  - Follow-up and assistance in implementing the seed production programme (Bangun Bandar), respecting instructions specific to such production,
  - Planting materials for Socfindo and Socfinco needs
  - Answer to customer requirements
- Aek Kwasan II
  - Preparation of the transfer of the seed production activities to Aek Loba
  - Implementation of the new seed garden
  - Opening of the new seed garden

3.4.3. Research & Development programme for Crop Protection

Integrated management of the BSR

- Follow – up and assistance to the observation in the Gano 1, Gano 2 and Gano 3 located at Mata Pao, Bangun Bandar and Tanah Gambus
- Monitoring of the observation in the Aek Loba Timur Genetic Block
- Monitoring of BSR spread over commercial estates
- Follow-up and assistance in Socfindo planting material testing at Tanah Gambus Phyto laboratory
- Assessment of a new BSR sanitation policy

Integrated management of Oryctes and other pests

- Preparation of a specific R&D programme to control the *Oryctes rhinoceros* in the Socfindo estates in co – operation with the Cirad consultants and the industry
- Implementation of the biological control of *Oryctes rhinoceros* at Aek Loba
- Integrated control of *Sufetula*

Integrated management of the fruit set

- Monitoring of the Elaeidobius kamerunicus population, preparation of a specific R&D programme to follow – up the seasonal variation of its population in co – operation with the Cirad consultants and the industry

3.4.4. Research & Development programme for Environment, Social and Sustainability

Integrate the RSPO principles and criteria in the PT Socfindo management and field practices

- Preparation of the integration of the principles and criteria for SPO in the management and field practices at PT Socfindo
- Participation to the identification of the indicators needed to evaluate the SPO principles and criteria
- Participation to the implementation of ISO14000 procedure

- Participation in technical meetings, customer visits, etc, whenever useful or desired, at PT Socfindo' request

Develop new projects taking in account the Environment protection

- Participation to various projects (BACP, PanEco)

3.4.5. New projects

- Creation of Aek Loba Seed production unit
- Biotech Units (Tissue culture, ID Checking, Leaf, soil and residue analyse laboratory)

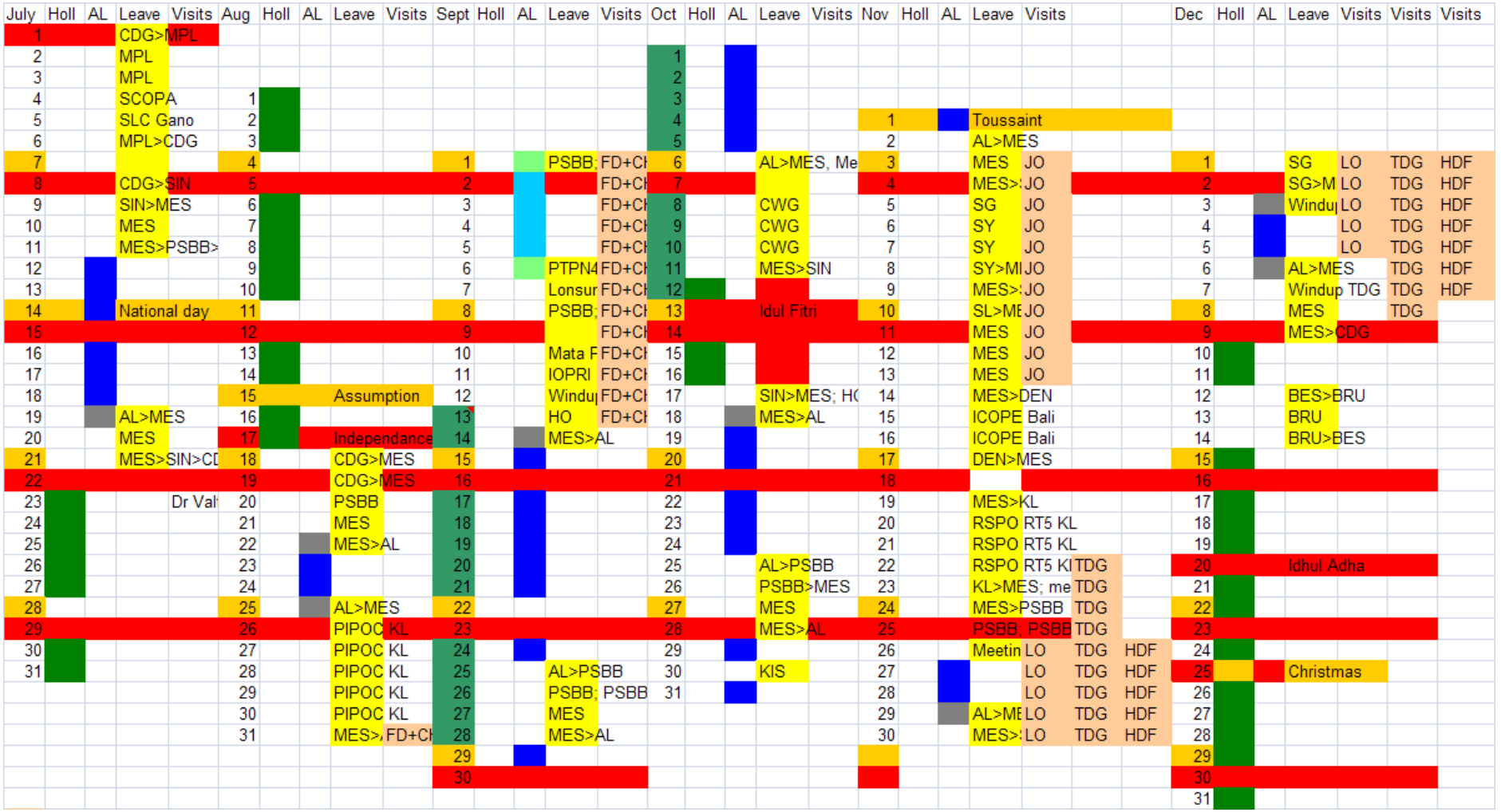
3.4.6. Publications, Conferences and general reports

In first priority: R&D reports (other than Agronomy)

Annex 1

Scientific & Technical Adviser Agenda

Scientific & technical Adviser Agenda for 2007 second semester



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1			CDG>MPL																											
2			MPL												1															
3			MPL												2															
4			SCOPA		1										3															
5			SLC Gano		2										4					1			Toussaint							
6			MPL>CDG		3										5					2			AL>MES							
7					4					1			PSBB;	FD+CI	6			AL>MES, Me		3			MES	JO	1			SG	LO	TDG	HDF
8			CDG>SIN		5					2				FD+CI	7					4			MES>:	JO	2			SG>M	LO	TDG	HDF
9			SIN>MES		6					3				FD+CI	8			CWG		5			SG	JO	3			Windu	LO	TDG	HDF
10			MES		7					4				FD+CI	9			CWG		6			SY	JO	4				LO	TDG	HDF
11			MES>PSBB>		8					5				FD+CI	10			CWG		7			SY	JO	5				LO	TDG	HDF
12					9					6			PTPN4	FD+CI	11			MES>SIN		8			SY>MI	JO	6			AL>MES		TDG	HDF
13					10					7			Lonsur	FD+CI	12					9			MES>:	JO	7			Windup	TDG	TDG	HDF
14			National day		11					8			PSBB;	FD+CI	13			Idul Fitri		10			SL>ME	JO	8			MES		TDG	
15					12					9				FD+CI	14					11			MES	JO	9			MES>CDG			
16					13					10			Mata F	FD+CI	15					12			MES	JO	10						
17					14					11			IOPRI	FD+CI	16					13			MES	JO	11						
18					15			Assumption		12			Windu	FD+CI	17			SIN>MES; HC		14			MES>DEN		12			BES>BRU			
19			AL>MES		16					13			HO	FD+CI	18			MES>AL		15			ICOPE	Bali	13			BRU			
20			MES		17			Independance		14			MES>AL		19					16			ICOPE	Bali	14			BRU>BES			
21			MES>SIN>CI		18			CDG>MES		15					20					17			DEN>MES		15						
22					19			CDG>MES		16					21					18					16						
23				Dr Val	20			PSBB		17					22					19			MES>KL		17						
24					21			MES		18					23					20			RSPO	RT5 KL	18						
25					22			MES>AL		19					24					21			RSPO	RT5 KL	19						
26					23					20					25			AL>PSBB		22			RSPO	RT5 KI TDG	20			Idhul Adha			
27					24					21					26			PSBB>MES		23			KL>MES; me	TDG	21						
28					25			AL>MES		22					27			MES		24			MES>PSBB	TDG	22						
29					26			PIPOC	KL	23					28			MES>AL		25			PSBB; PSBB	TDG	23						
30					27			PIPOC	KL	24					29					26			Meetin	LO TDG HDF	24						
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					30			PIPOC	KL	27			MES							29			AL>ME	LO TDG HDF	27						
					31			MES>,	FD+CI	28			MES>AL							30			MES>:	LO TDG HDF	28						
										29															29						
										30															30						
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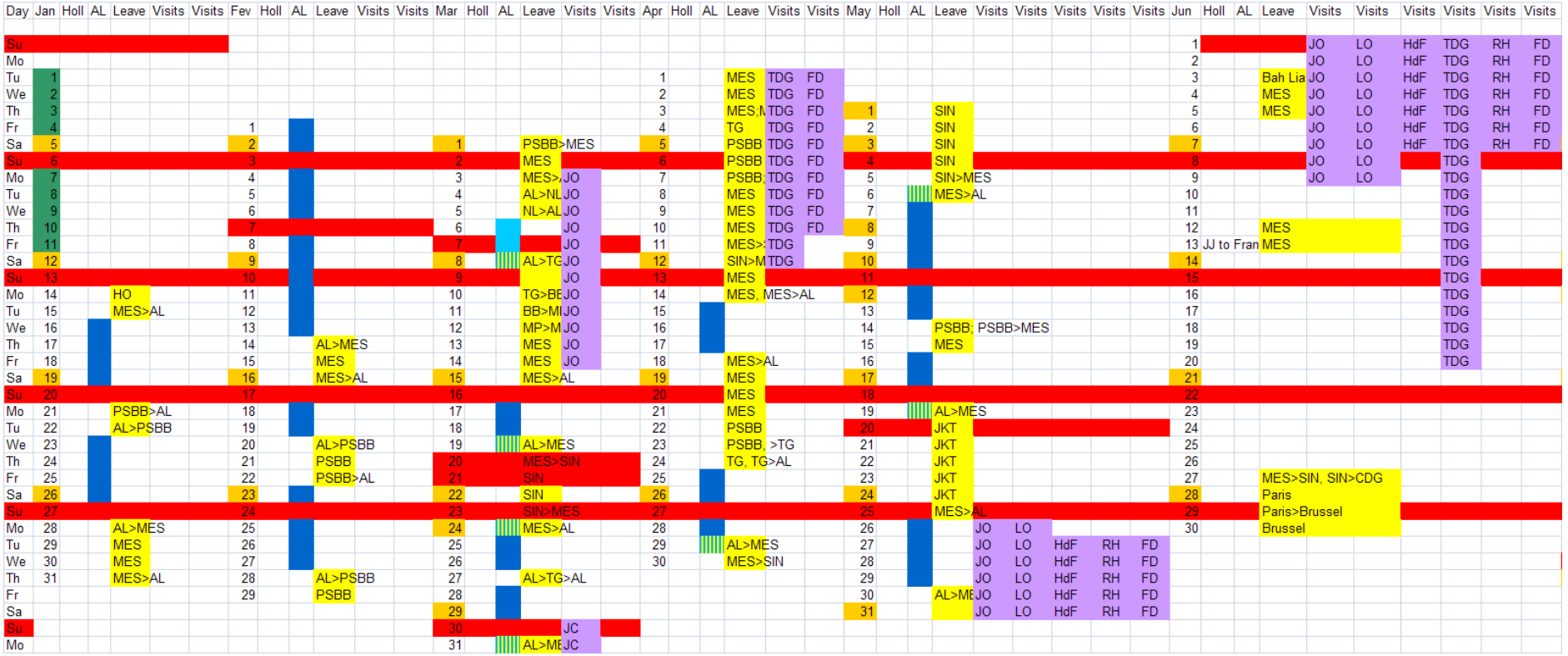
Scientific & Technical Adviser Agenda for 2008 first semester



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Su																																		1				JO	LO	HdF	TDG	RH	FD
Mo																																		2				JO	LO	HdF	TDG	RH	FD
Tu	1																		1			MES	TDG	FD									3			Bah Lia	JO	LO	HdF	TDG	RH	FD
We	2																		2			MES	TDG	FD									4			MES	JO	LO	HdF	TDG	RH	FD
Th	3																		3			MES;M	TDG	FD	1			SIN					5			MES	JO	LO	HdF	TDG	RH	FD
Fr	4						1												4			TG	TDG	FD	2			SIN					6				JO	LO	HdF	TDG	RH	FD
Sa	5						2						1			PSBB>MES			5			PSBB	TDG	FD	3			SIN					7				JO	LO	HdF	TDG	RH	FD
Su	6						3						2			MES			6			PSBB	TDG	FD	4			SIN					8				JO	LO		TDG		
Mo	7						4						3			MES>A	JO		7			PSBB;	TDG	FD	5			SIN>MES					9				JO	LO		TDG		
Tu	8						5						4			AL>NL	JO		8			MES	TDG	FD	6			MES>AL					10							TDG		
We	9						6						5			NL>AL	JO		9			MES	TDG	FD	7								11							TDG		
Th	10						7						6				JO		10			MES	TDG	FD	8								12			MES				TDG		
Fr	11						8						7				JO		11			MES>S	TDG		9								13	JJ to Fran		MES				TDG		
Sa	12						9						8			AL>TG	JO		12			SIN>M	TDG		10								14							TDG		
Su	13						10						9				JO		13			MES			11								15							TDG		
Mo	14			HO			11						10			TG>BE	JO		14			MES,	MES>AL		12								16							TDG		
Tu	15			MES>AL			12						11			BB>MI	JO		15						13								17							TDG		
We	16						13						12			MP>M	JO		16						14			PSBB;	PSBB>MES				18							TDG		
Th	17						14			AL>MES			13			MES	JO		17						15			MES					19							TDG		
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Tu	22			AL>PSBB			19						18						22			PSBB			20			JKT					24									
We	23						20			AL>PSBB			19			AL>MES			23			PSBB,	>TG		21			JKT					25									
Th	24						21			PSBB			20			MES>SIN			24			TG, TG>AL			22			JKT					26									
Fr	25						22			PSBB>AL			21			SIN			25						23			JKT					27			MES>SIN, SIN>CDG						
Sa	26						23						22			SIN			26						24			JKT					28			Paris						
Su	27						24						23			SIN>MES			27						25			MES>AL					29			Paris>Brussel						
Mo	28			AL>MES			25						24			MES>AL			28						26				JO	LO			30			Brussel						
Tu	29			MES			26						25						29			AL>MES			27				JO	LO	HdF	RH	FD									
We	30			MES			27						26						30			MES>SIN			28				JO	LO	HdF	RH	FD									
Th	31			MES>AL			28			AL>PSBB			27			AL>TG>AL									29				JO	LO	HdF	RH	FD									
Fr							29			PSBB			28												30			AL>ME	JO	LO	HdF	RH	FD									
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Mo													31			AL>ME	JC																										

Annex 2

Summary of 2007 general comments and food for thought needing emphasization in Cirad support

R & D for Agronomy and field practices

Support to fertilisation programme

Volunteer Boron deficiency in De * LM materials at young age

Field practices, plantation management & mill processing

Recurrent fruit set problems

- Affect OER at NL and MP
- Many "broccoli" bunch
- Not only a problem of manual assisted pollination
- Ablation spathes at MP >> 22% ABW improvement
- Study of complex fruit set / male flowering and assisted pollination / pollinator fauna / predators and diseases
- Implies cooperation between agronomists, breeders, entomologists and ecologists

Emphasise implementation of GIS with good portal

R & D for breeding and seed production

Variety creation

Use of MAS in R & D for breeding and observations in ALGP 29
Development project from Certipalm
RSPO = afford particular attention to planting materials, Customers requirements:

- Corner stone = OER & FFB
- Plus:
  - Palms better adapted to specific environments
  - Tolerance to various stress factors
  - Adaptation to specific nutrient requirements
  - Resistance to specific diseases / pests
  - Economic factors: growth, ABW, sex ratio, CPO / PKO, density
  - Olein / stearin, IV, carotene content

Variety propagation

Customer requirement to be involved in planting material choice
Few SCA
Many combination A*B group families never been crossed
What about 20% no – additive effect?
Abnormalities like:

- Fruits at extremity of spikelets
- Abnormal palms
- Stubborn boron deficiency

Curvularia in AKII seed and parental garden
Non expected crown disease in Deli*La Mé
Oil palm vegetative propagation laboratory

R & D for crop protection

Integrated management of the BSR

Emphasise GIS management at Socfindo (agronomy, field practices, and *Ganoderma* management)

Cirad support for GIS (efficient and handle portal?)

Integrated management of Oryctes and other pests

Remains under construction

Integrated management of fruit set

Remains under construction